A METHOD FOR TEACHING A LANGUAGE

FIELD OF THE INVENTION

The present invention relates to language
5   teaching.

For convenience, the present invention will be
described primarily with regard to teaching the English
language. However, it is to be understood that the
invention is equally applicable to teaching other
10   languages.

A typical way of teaching a language such as
English involves a classroom situation with a teacher
demonstrating the pronunciation of various combinations of
letters and words and with students repeating these sounds
15   as a group. More recently it is possible to supplement
this technique by using computer-based language teaching
aids. However, such aids tend to have limited value as
they have a piecemeal structure which is difficult to
navigate.

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BRIEF DESCRIPTION OF THE PRIOR ART

Some existing teaching aids utilise computer-
aided techniques using speech recognition software.
Typically such computer-based teaching methods involve a
25   student repeating a word which is pronounced by a computer
tutor, such as in US patent no. 41210512. Other teaching
methods such as that disclosed in PCT application no. WO
00/60560 disclose a method of converting plain English
text to a number of levels of enriched text, each of which
30   incorporates progressively more clues to the pronunciation
of the words of the text. The clues include colours,
shapes, graphs and markers which tend to complicate rather
than simplify the learning process.

SUMMARY OF THE INVENTION

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The present invention is aimed at providing an
alternative method of teaching a language. In a

particular form the invention is directed at a method of encoding words which enhances a student's ability to learn how to pronounce different words.

5   According to a first aspect of the present invention there is provided a method of encoding words for language teaching comprising the steps of identifying a plurality of different vowel sounds, representing each different vowel sound by a first indicia and a second indicia, storing the different first and second indicias

10   for each vowel sound, identifying a plurality of different consonant sounds, representing each consonant sound by a third indicia and a selection of consonant sounds by a fourth indicia, storing the third and fourth indicia for each consonant sound, identifying a plurality of different

15   silent letters occurring in words, representing each silent letter by a fifth indicia and storing the fifth indicias for each silent letter whereby a word is represented by a combination of the first to fifth indicia.

20   According to another aspect of the present invention there is provided a method of displaying words for language teaching, comprising the steps of identifying a word, encoding the word into a plurality of indicia components and displaying the encoded word comprising

25   indicia components, wherein the plurality of indicia comprise a first and second indicia representing different vowel sounds, third indicia representing different consonant sounds, fourth indicia representing a selection of consonant sounds and fifth indicia representing

30   different silent letters occurring in words.

          According to a further aspect of the present invention there is provided a system for teaching a language comprising a database which stores a plurality of different vowel sounds, with each vowel sound represented

35   by a first indicia and a second indicia, a plurality of different consonant sounds, with each consonant sound represented by a third indicia and a selection of

consonant sounds by a fourth indicia, a plurality of
different silent letters occurring in words, with each
silent letter represented by a fifth indicia, and a
plurality of different words, a conversion means which
5   converts each word into a converted form comprising the
indicia and a display means which displays a word in
converted form, and wherein the conversion means is
adapted to convert a word input into the system and
utilise the display means to display the word in converted
10   form.

It is preferred that the methods and system
involve storing all different vowel sounds and all
different consonant sounds.

Preferably the selection comprises consonants,
15   diagraphs or consonant blends or other consonants having a
particular characteristic.

Preferably, the method includes identifying a
plurality of different consonant diagraph sounds,
representing each consonant diagraph sound by a sixth
20   indicia and storing the sixth indicia for each consonant
diagraph sound.

An indicia may include any symbol(s), number(s),
notation(s), letter(s), colour(s), font(s), mark(s),
representation(s), zone(s) or any other sign.

25   The method may include creating a database
comprising the different indicia.

According to one embodiment the method includes
creating a dictionary database which stores the meaning of
each word.

30   According to another embodiment the dictionary
database stores the prefix, roote and suffix of words.

According to a further embodiment the method
involves displaying the prefix/roote and suffix of each
word.

35   It is preferred that words displayed with a
prefix, roote and suffix are shown in coded form
represented by the applicable indicia.

According to another embodiment the strength of each sound is represented by a seventh indicia.

The seventh indicia may be a different level of brightness or boldness of colour for the letter or letters
5   of the particular sound.

The database may store a plurality of words with each word represented by a composite of indicia.

The database preferably stores words divided into multiple syllables.

10   It is preferred that words are divided into constituent components of vowel sounds, consonant sounds and silent letters.

Words divided into constituent sounds are preferably then converted into corresponding indicia
15   representing each of those sounds.

It is preferred that words are stored once converted into constituent indicia components.

Preferably, the database stores words with multiple syllables.

20   It is preferred that each word is stored with links to constituent indicia components which represent the word when it is displayed in converted form.

Preferably, the second indicia are substantially the same for each vowel sound.

25   According to one example, a second indicia comprises a colour which is substantially the same for each vowel sound.

Preferably, the fourth indicia are substantially the same for each consonant sound.

30   As an example, each consonant sound has substantially the same colour.

The colour of each second indicia is preferably different to the colour of each fourth indicia.

The fifth indicia may be substantially the same
35   for each silent letter.

As an example the fifth indicia may be substantially the same colour.

One or more the indicia may have different levels of any one or more of, brightness, colour, contrast, boldness to represent strength of associated vowel or consonant sound.

Preferably, the vowel sounds include one or more vowels.

Preferably, the consonant sounds include one or more consonants.

It is preferred that the first indicia is different for each vowel sound.

According to one example, a first indicia is a number, with different numbers representing different vowel sounds.

According to one embodiment, only consonant sounds which have more than one pronunciation have a third indicia.

As an example, a third indicia may be a superscript symbol or the absence of such a symbol.

Preferably, the first indicia comprises a superscript symbol.

According to a further embodiment of the present invention the third indicia comprises a sign representing a consonant diagraph.

The first and/or third indicia may be in the form of superscripts or subscripts.

The method of displaying words may include displaying the first indicia above the vowel sounds.

The method of displaying may include displaying a word as a combination of vowel sounds, consonant sounds and silent letters.

According to one embodiment, multiple syllable words are displayed with a dividing means between syllables.

The dividing means may be punctuation marks such as a hyphen or dot.

According to one embodiment of the invention the methods and system include displaying a matrix/grid with

vowel sounds along one axis and consonant sounds along
another.

It is preferred that the axis form columns and
rows.

5   The grid may comprise grid spaces or squares or
equivalent marks representing a combination of one vowel
sound and one consonant sound along respective axes.

Preferably, the method includes displaying a
composite of any vowel sound and consonant sound once a
10   grid is selected corresponding to an intersecting row and
column of one vowel sound and one consonant sound.

Alternatively, vowel sounds and consonant sounds
are represented in separate groups with a link between
each vowel sound and consonant sound which is able to be
15   blended together.

The methods may include displaying visually
and/or aurally words or blended sounds.

According to one embodiment the method includes a
speaking means which pronounces different sounds when
20   blended together.

According to another embodiment of the invention
the method includes displaying rows/columns of consonants
and consonant diagraphs.

The methods and system may include searching for
25   words including at least one of the indicia, vowel sounds,
consonants, consonant diagraphs, silent letters.

The step of searching may include searching for
words having a combination of two or more of (indicia one
to six, vowel sounds, consonant sounds, consonant
30   diagraphs, silent letters, two syllables, three syllables,
greater than three syllables, predetermined word lengths,
words).

The step of searching may be based on the
position of stressed syllables.

35   The step of searching may include searching
through converted words stored in a database to a identify
any search criteria.

It is preferred that each word which is stored in the database is stored with links to files with data relating to features of the word including:

number of indicia, types of indicia, location of
5   indicia, number of syllables, word length, different sounds, etc.

The methods and systems may include providing an interrogation means which is configured to receive one or more of the items: indicia one to six, vowel sounds,
10   consonant sounds, silent letters, number of letters in a word, number of syllables in a word or other data relating to a word.

Preferably, the step of searching is followed by the step of displaying the search results with words in
15   converted form arranged in a predetermined order such as alphabetically.

It is to be understood that reference to marks, squares, spaces include reference to symbols, labels, signs, spaces, representations, indicia, indications,
20   points, areas, zones or any other ways of representing.

It is also to be understood that reference to arrays or grids include any equivalent representations in which different types of sounds are able to be combined and represented by a single mark or equivalent.

25   It is preferred that the methods include displaying an array showing consonant blends such as, for example, a row of some consonants and a column of other consonants. The array may comprise a plurality of marks or squares with squares highlighted if consonant blends
30   are permissible.

Preferably, marks can be activated to produce an indication of the consonant blend sound.

Preferably, displaying an array or grid includes an array of initial consonant blends or final consonant
35   blends.

A mark may be activated by controlling a cursor for example, by clicking on a mouse.

According to one embodiment the methods include displaying a plurality of different grids each with different blends of sounds.

As an example, a column may list one type of
5   sound, for example a vowel sound, consonant sound, consonant diagraph sound and a row may list another of one of the vowel sounds, consonant sounds, consonant diagraphs.

The intersection of a row/column may be
10   represented by a mark with each mark representing a different blend of sounds.

The method may include a plurality of teaching lessons.

Preferably one teaching lesson is associated with
15   one array/grid of blended sounds.

One teaching lesson may highlight examples of blended sounds on the grid.

The step of highlighting may include representing the intersection of a row and column forming a blended
20   sound differently from other grid zones.

The step of highlighting may include providing intersection marks between blended indicia/sounds.

Intersection marks may comprise lines extending from row and column sounds.

25   It is to be understood that, if any prior art publication is referred to herein, such reference does not constitute an admission that the publication forms a part of the common general knowledge in the art, in Australia or in any other country.

30   In the claims which follow and in the preceding description of the invention, except where the context requires otherwise due to express language or necessary implication, the word "comprise" or variations such as "comprises" or "comprising" is used in an inclusive sense,
35   i.e. to specify the presence of the stated features but not to preclude the presence or addition of further features in various embodiments of the invention.

It is to be understood that the aforementioned preferable statements refer to important features of different embodiments of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

Preferred embodiments of the present invention will now be described by way of example only with reference to the accompanying drawings, in which:

Figure 1a shows an example of a word converted to a coded form in accordance with a preferred embodiment of the invention;

Figure 1b shows a representation of different vowel sounds in accordance with the present invention;

Figure 2 shows a representation of different consonant sounds in accordance with a preferred embodiment of the present invention;

Figure 3 shows examples of different silent letters in accordance with the preferred embodiment of the invention;

Figure 4 shows a display of consonant sounds and vowel sounds in accordance with the preferred embodiment of the invention;

Figure 5 shows a grid system for displaying consonant blends in accordance with the preferred embodiment of the invention;

Figure 6 shows another embodiment of a grid structure for consonant blends in accordance with the present invention;

Figure 7 shows a further embodiment of a grid structure for blending sounds in accordance with the present invention;

Figure 8 shows a search system in accordance with the preferred embodiment of the invention;

Figure 9 shows an example of a sentence with words converted to a coded form in accordance with the preferred embodiment of the invention; and

Figure 10 shows an example of an indexing method for storing words in a library database in accordance with

the preferred embodiment of the invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

The invention is preferably implemented using
5   computer software to control operation of a data processor
such as a personal computer. It should be understood
however, that the invention may be used as a teaching aid
independently of computer software. For example, the
invention may be implemented in a book form which may
10   incorporate cards with specific information on them.

To assist with an understanding of the invention,
the preferred embodiment will be described with reference
to an English language implementation of the invention
with particular emphasis on a computer software
15   implementation of the invention.

In accordance with the preferred embodiment, any
word in the English language is converted to a form which
enables a student learning English to easily understand
how each word is pronounced. Furthermore, the converted
20   or encoded form of each English word permits a logical and
structural approach to teaching and learning English to be
achieved.

As shown in Figure 1b, in accordance with the
preferred embodiment of the invention, each English vowel
25   sound is represented by a number from 1 to 23. This
covers all the possible vowel sounds in the English
language. Thus, as an example the word "cat" is
represented with a number 1 above the letter "a". This
signifies that the vowel sound 1 has the same
30   pronunciation as the letter "a" when used in the word
"cat".

In a similar fashion, in the word "snake" a
numeral 6 is located above the letter "a". This signifies
that the vowel sound 6 is pronounced as "a" in "snake".
35   This contrasts with the vowel sound 13 for pronouncing "a"
in the word "about".

Vowel sounds which include a combination of

vowels are also represented by a number such as the number
23 which represents "ow" as pronounced in the word
"flower", or the vowel sound 22 which designates the "ou"
sound in the word "tour".

5   By breaking the number of vowel sounds into a
minimum of 23, it is possible to simplify teaching vowel
sounds occurring in words.

          As an example, the vowel sound 23 which
represents the "ow" sound occurring in the word "flower"
10   also represents the "ou" in the word "grout". This
simplifies learning of the pronunciation of English words
because the student only needs to concentrate on the type
of vowel sound as represented by the coded number, rather
than how the vowel sound is spelt. Over a period of time
15   a language student would become more familiar with the
different ways of spelling the same vowel sound occurring
in different words.

          In addition to the above, each vowel sound is
represented by a colour which in Figure 1 is red. This
20   clarifies which letters are to be pronounced according to
the coded representation of the vowel sound. Thus, in the
word "about" the number 13 is provided as a superscript
above the letter "a" which is coloured red. The rest of
the word, ie. "bout" is differently coloured for the
25   purposed of this example. This makes it clear that the
vowel sound is associated with the letter "a" and not the
letters "ou" for example. This makes it easier for a
student to identify the vowel sound and the letter or
letters which are to be pronounced in accordance with the
30   vowel sound. Furthermore, although it is preferred that
the vowel sound is represented as a number in superscript
form above the particular letters concerned, in a word
with a single vowel sound being exemplified, the location
of the vowel sound superscript is not as important as it
35   is instantly recognisable as being associated with the
letters in red. Of course in a word with a number of
different vowel sounds, this approach would not be ideal.

However, it is also possible to represent the different
vowel sound numbers in a colour which is the same as the
letters with which they are associated. Thus, in Figure 8
the word "collection" includes vowel sounds 13 and 2. By
5   placing the number 13 above the letter "o" it is clear
that the "o" in collection is pronounced as vowel sound 13
and the letter "e" with the superscript 2 above it is
pronounced as vowel sound 2. Both the letter "o" and the
letter "e" may be red like the superscripts 13 and 2.
10 However, according to another embodiment the numeral 13
and the letter "o" may be represented in one colour and
the number 2 and letter "e" by another colour.

Another advantage of representing vowels sounds
in the manner outlined above is that students can see a
15 word and instantly know how the vowel sound should be
pronounced.

Figure 2 shows a list of the consonant sounds as
part of a word in a similar fashion to the list of vowel
sounds. Each consonant sound is represented by a blue
20 colour with the rest of word being in black. Consonant
sounds which are the result of a combination of at least
two letters are highlighted by either a superscript
symbol, such as ⊙ for the consonant sound "th" or by the
phonetically equivalent letters for that consonant sound.
25 Thus in the word "treasure" the letter "s" is highlighted
in blue with the letters "zh" in superscript form above
it.

If the consonant sound is formed by a combination
of letters (consonant diagraphs), they are also
30 highlighted by being underlined. Thus the consonant sound
"qu" in "queen" is shown underlined and also has a
superscript "kw" indicating how the "qu" sound is
pronounced.

In a word where a consonant is not highlighted by
35 a symbol or with a superscript or underlining, it is
understood that the consonant is pronounced in accordance
with the consonant sounds as shown in the list in Figure

2.   Thus, as shown, there are 27 different consonant
sounds which are represented according to the preferred
embodiment.

          Finally, there are letters in the English
5   language which are not pronounced or in other words are
silent letters. Examples of these are shown in Figure 3.
In each word where a silent letter or combination of
letters occurs, it is represented by a colour different to
that adopted for a vowel sound or a consonant sound. It
10   may also be represented in other forms such as in a
particularly light or faint colour. Thus, in the word
"knight", the letter "k" and the letters "g" and "h" are
each silent. They are therefore represented in a light
grey colour whereas the consonants "n" and "t" are
15   represented in blue and the vowel "I" in red. In this way
and as exemplified further in Figure 1A it is possible to
convert any word into a coded form utilising the coding
system exemplified with reference to Figures 1B, Figure 2
and Figure 3.

20   In Figure 1A the word "choice" is able to be
converted and represented with the consonant sound "ch" in
blue and underlined, the letters "oi" in red with a
superscript number 17, the letter "c" in blue with the
superscript S, and the letter "e" in grey as a silent
25   letter. From this coded representation of the word
"choice", a student is able to know instantly having
memorised the codes for the vowel sounds, consonant sounds
and silent letters how to pronounce the word "choice" with
certainty of its correct pronunciation. Thus in this
30   example the letters "ch" are pronounced as in the word
"chin", the letters "oi" are pronounced as in the word
"boy", the letter "c" is pronounced as the letter "s" in
"sun" and the letter "e" is not pronounced at all. It
follows that by learning the 23 different vowel sounds,
35   the 27 different consonant sounds and the code for
different silent letters a student can look at a word
coded in this format and determine the pronunciation with

certainty.

It is to be noted that for the silent letters
there are many combinations of letters which when
occurring in words are not necessarily pronounced.   Such
5   as the letters "a" and "l" in the word "basically".
Therefore the list of silent letters is not fixed.

Because words are now able to be represented in a
coded form which enables a teacher or student to pronounce
the word with certainty, a teaching format is possible
10   which potentially makes learning a language such as
English much easier.

Figure 4 shows a computer or video implementation
of the coding format of the preferred embodiment in which
the list of consonant sounds and vowel sounds are provided
15   in separate boxes 11, 12.   In the computer implementation
by clicking a cursor located on one of the consonant or
vowel sounds a display is provided of words incorporating
these sounds.   Thus for vowel 1 which is highlighted in
Figure 4, the word "hat" appears with the superscript 1
20   above the letter "a" in red.   The letters "h" and "t" are
both blue.   A pictorial representation of a hat is
displayed above the word and other things involving the
same vowel sound such as a "cat" and a "bat" are shown to
enable a student to practice the vowel sound represented
25   by the numeral 1.   Item 13 refers to a visual/audio
feature of the preferred embodiment in which a model
pronounces the sound to enable a student to view lip,
tongue and facial movements to produce the sound.

Another feature of the preferred embodiment is
30   shown in Figure 5.   This figure shows a grid used to
reproduce the initial consonant blend sounds in English.
A voice file of a consonant blend is played by clicking on
one of the darker blue buttons (dark grey in Figure 5).
The grid 14 shown in Figure 5 consists of a vertical axis
35   or column of initial consonant sounds 15 and a horizontal
axis 16 of vowels which can be added to those in the
column 15.   A highlighted section 17 (dark grey) shows

each grid square where it is possible to combine
consonants in the column 15 with consonants in the row 16.

As an example the consonant "s" in column 15 when
combined with consonant "l" in row 16 is represented as a
5   darkened grid square "sl" on grid 14. If there is no
English word which combines a consonant in column 15 with
a consonant in row 16, then the grid appears as a blank
square 18 for example. Thus the consonants "b" and "c"
together represented as the first consonant in column 15
10 and row 16 respectively does not occur in an English word
and therefore results in a blank square.

Because the grid incorporates the coding system
outlined above a student will know how to pronounce a
consonant blend by having previously memorised the coded
15 sounds in accordance with the preferred embodiment.

As an example, the consonant sound "s" when
combined with the consonant sound "hr" is represented by
"sh" underlined, followed by "r".

It is noted that a complete line is highlighted
20 even if not all squares represent initial consonant
blends. This allows a student to easily follow the lines
of intersection between consonants in column 15 and in row
16.

Figure 6 shows a modification of the grid format
25 for displaying blends of consonants so that it is more
appropriate for final consonant blends. Thus, a
rectangular grid 19 is shown as a display on a computer
monitor, for example. Thus, a column of consonants
-c l m n p s- represented by item 20 is shown with a row
30 of consonants -c d k p t c h- represented by item 21.

The consonant blends which are allowable are
highlighted in dark blue squares 22. Those which are not
allowable remain as blank squares.

As an example the final consonant blend formed by
35 combining consonants "m" and "p" results in the consonant
blend "mp" represented by item 23.

A further extension of the grid concept is shown

in Figure 7 where a grid 24 is displayed which provides a
combination of the most commonly used consonant blends of
English with the 23 different vowel sounds. The
crosshairs on the screen locate a particular combination

5   of consonant blend and vowel sound. As illustrated, the
voice file would play consonant blend "gl" with vowel
sound 8 to produce "gli" as in "glide". Dark cells
indicate that the combination of consonant blend and vowel
sound is used in English. Empty (white) cells indicate

10 that this combination of consonant blend and vowel sound
is rarely used or not used at all in English.

        In grid 24 the consonant sounds are shown along
the vertical axis as item 25 and the vowel sounds along
the horizontal axis as item 26.

15   The point of intersection of a consonant and
vowel sound such as the "gl" and "8" as referred to above
is highlighted by a darker coloured square. An
illustration then can appear below showing a word with the
blend and a voice and/or video representation can be

20 provided to simulate the consonant/vowel blend.

        Figure 8 illustrates how the coding system
outlined above can be used to provide a simple way of
searching for different sound patterns.

        Because each word may be encoded in an electronic

25 form, it is possible to search for words having particular
sounds. This includes combinations of sounds as well as
combinations of sounds with other characteristics of
words.

        As an example a word will typically have the

30 following features:

        a number of letters, syllables, consonants,
vowels, vowel sounds, consonant sounds, consonant
diagraphs, consonant blends, silent letters, as well as
different degrees of emphasis on letters in the words.

35 The comprehensive nature of the coding system for each
word enables a student to access different combinations of
the above to practice word pronunciation and observe

differences and similarities in pronunciation.

Each word in the dictionary is stored in a coded
form with links to data relating to each word. Thus a
request for a search as shown in Figure 8 for the

5   consonant "c" vowel sound 13 in combination with consonant
sound "sh" vowel sound 13 and consonant "n" produces the
list of words shown in Figure 8. Each of these words
includes the consonants, vowel sounds and consonant sounds
requested in the search bar 30. Each of these words is

10   shown in its coded form so that it can be easily
pronounced. In addition letters or sounds which are
emphasised are represented by a bolder font. Thus the
word collection is shown in the second occurrence of "l"
shown in a darker blue than the letter "c" at the

15   beginning of letter. Likewise the second occurrence of
the letter "c" is shown in a darker blue along with a
bolder version of the letter "e" with the superscript ^{2}
above it. The vowels "o" are represented in a normal or
darker font than the letter "e". The letters "ti" and "n"

20   are represented in the same font as the first letter "c".
This representation indicates that the "lec" in the middle
of the word collection is emphasised more than the first
and third syllables.

Each of the other words shown in Figure 8 also

25   have emphasis on the second syllable and are shown in
darkened font. Thus in addition to the coding previously
outlined, vowel sounds and consonant sounds can be
represented in a different format such as by bolding
colours or providing letters in different font to

30   highlight an emphasis of a sound.

By using the coding system outlined above a
search engine can interrogate a dictionary of thousands of
colour and sound coded words for families of words with
the same sound patterns. Figure 8 shows the result of

35   searching for three syllable words with the same beginning
sounds and the same final sounds. The advantages of this
searching system include the following:

       i.   the different ways the sound "sh" is spelled in these words;

       ii.   the position of the stressed syllable bold print;

5   iii. the frequent use of vowel sound 13 (schwa sound) in the unstressed syllables of longer words; and

       iv.   the rhythm and modulation of spoken English for this family of words as they are read out aloud.

       Commands for interrogating the data base for the
10 family of three syllable words begins with the hard sound of "c" then has "c" immediately followed by vowel sound 13.

       According to one embodiment of the invention a system is provided incorporating a data processor, a
15 scanner, a microphone, a mouse or similar cursor controller and software for electronically coding words into a phonetically coded text.

       A system for implementing an automated teaching/learning aid incorporating the word coding system
20 consists of a data processor such as a computer with inputs to a scanner, a keyboard, a camera, a microphone and a mouse or other cursor controlling device. The processor may incorporate or be connected to a data base and to a display unit such as a computer monitor.

25   In accordance with the above system a student is able to type in a sentence using the keyboard and the sentence which for example may be "thank you for taking us out to dinner" is broken into individual words by the data processor which then accesses a library data base
30 containing each of the words in phonetically coded form. The coded words are then displayed on the monitor in the coded form. This may be as shown in Figure 9. When the sentence is typed in it is also possible to select a style of the English language such as Australian, UK or USA.
35 The coded text is then produced as shown in Figure 9. As shown each word is broken into its phonetically coded parts which include vowel sound codes, consonant sound

codes and silent letter codes. It is also noted that dots
are used to separate syllables of a word.

If the student does not desire to type in a
sentence a scanner can be used to scan the sentence in or
5   the word can be electronically transmitted from another
location and even recorded by the microphone and camera.
Furthermore voice recognition software can record a
sentence and convert the sentence to the phonetically
coded form shown in Figure 9.

10   In accordance with the preferred embodiment words
are stored in the library data base in a format similar to
that shown in Figure 10. The database table shown
includes the following:

index: gives each word a unique index;
15   B and W word: gives a simple black and white
representation of the word;
AUS encoding: encoded string of characters
which details the phonetic encoding of the word
for Australian accents;
20   USA encoding: as above only for mid-Atlantic
accents from the USA;
Other encodings: this represents multiple
columns, one per accent, like AUS and USA;
Flags: a bit mask holding information on
25   special properties of certain words such as:
whether the word is a proper noun, whether the
word appears in certain accents (e.g. "color"
only appears in USA accents, "colour" appears in
Australian and British Accents).
30   When a word is received for encoding, the accent
button is selected and the computer program initiates a
converter to convert from B and W to coloured. The
converter breaks the passage into words. Words are
separated by white and/or other non-alphabetical
35   characters. Some words are coded in the dictionary with
non-alphabetic characters including, e.g. "don't".
Because of this the converter needs to consult the library

data base "dictionary" and do more than one pass over then
input B and W text to decide how to break the input text
into words.

5   As the pronunciation of some words charges
depending on position relative to other words "e.g. when
the word "the" immediately precedes a word starting with a
vowel, it has a long 7 "e". When the word "the"
immediately precedes a word starting with a vowel, it has
a short 13 "e". The converter is able to identify which
10   type of "e" vowel sound is applicable and produce a word
with the appropriate vowel sound code.

        The encoding process may also use information in
a flags column to alter the coloured output for a coded
word in a variety of ways.

15   An example of the encoding process is provided as
follows:

        For the example: head phone, the word is split
into vowels and consonants. Each sound is appended with a
pipe

20   h|ea|d|ph|o|n|e|

        Any syllables are inserted as asterisk characters
with trailing pipes.

        h|ea|d|*|ph|o|n|e|

        Supercripts and colouring are added by adding a
25   caret followed by a code.

        h|ea^2|d|*|ph^f|o^9|n|e^0|

        Stress is added by adding square brackets around
a section of the word.

        [h|ea^2|d|]*|ph^f|o^9|n|e^0|

30   Consonant diagraphs are notated by adding curly
braces around their component characters.

        [h|ea^2|d|]*|{ph^f|}o^9|n|e^0|

        This is the format used by the dictionary
editors. The way it is stored on disk in memory as a
35   machine readable format will change to avoid the use of
printing characters.

        The searching process as outlined previously

involves looking for matches of items entered into the
search window in the library database.

Although it is preferred that the above
embodiment of the invention is implemented using computer
5   software it is also possible to provide a converter in the
form of electronic hardware with embedded programming
which allows conversion of words to the phonetically coded
format.